

Docket No.: 38814-351B, Gijls van Rooijen  
Filed: December 19, 2001

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TR  
ATTHIREDB

10 20 30 40 50 60 70 80 90 100 110 120

TR  
ATTHIREDB

130 140 150 160 170 180

TR  
ATTHIREDB

190 200 210 220 230 240

TR  
ATTHIREDB

250 260 270 280 290 300

TR  
ATTHIREDB

310 320 330 340 350 360

TR  
ATTHIREDB

370 380 390 400 410 420

TR  
ATTHIREDB

430 440 450 460 470 480

TR  
ATTHIREDB

490 500 510 520 530 540

TR  
ATTHIREDB

550 560 570 580 590 600

TR  
ATTHIREDB

610 620 630 640 650 660

TR  
ATTHIREDB

670 680 690 700 710 720

TR  
ATTHIREDB

730 740 750 760 770 780

TR  
ATTHIREDB

790 800 810 820 830 840

TR  
ATTHIREDB

850 860 870 880 890 900

TR  
ATTHIREDB

910 920 930 940 950 960

TR  
ATTHIREDB

970 980 990 1000 1010 1020

TR  
ATTHIREDB

### FIGURE 1

Translation of ATTHIREDB  
Translation of TR

10 20 30 40 50 60  
MNGLEETHTNTRLCIVGSGPAHTAAAYAAAEKPELEEGWMAEDLAFGGQLNQPP-RLENF  
MNGLEETHTNTRLCIVGSGPAHTAAAYAAAEKPELEEGWMAEDLAFGGQLTTTDDVENF

70 80 90 100 110 120  
PCFFEGGLGVEETDKPRKQSERFGTTTETETVTKYDRSSKPEKEDTDSKALADAVILA  
PCFFEGGLGVEETDKPRKQSERFGTTTETETVTKYDRSSKPEKEDTDSKALADAVILAT

130 140 150 160 170 180  
CAVAKWLSFVGSGLVLCGLWNRGLSACAVCDGAPFRNKPLAVTGGGDSAMEEANPDTK  
CAVAKWLSFVGSGLVLCGLWNRGLSACAVCDGAPFRNKPLAVTGGGDSAMEEANPDTK

190 200 210 220 230 240  
YGSKYVYTHRRDAFRASKIMQORALSNEKIDVWNSSVVEAYGDCERDVLCGLKKNVYT  
YGSKYVYTHRRDAFRASKIMQORALSNEKIDVWNSSVVEAYGDCERDVLCGLKKNVYT

250 260 270 280 290 300  
CDVSDLVKVSGLFFALGHEPATKFLDGGVFLDSGGYVVTKEGTEQTSVFGVFAAGDVKKK  
CDVSDLVKVSGLFFALGHEPATKFLDGGVFLDSGGYVVTKEGTEQTSVFGVFAAGDVKKK

310 320 330 340 350 360  
YRQALTAAGTGCMALDAEHLQELGSGQGGKSD  
YRQALTAAGTGCMALDAEHLQELGSGQGGKSD

FIGURE 2

*M.lep TR/Trxh*  
*Arab TR-link-Trxh*

10 20 30 40 50  
 MNTITPSSAHETIHETVIVIGSGPAGYTAALYAARAQITFLVPEG:::ITSE  
 MNGLETHNT:::RLECIVGSGFAAHHTAALYAARAELKFLLEPEGWMANDIAP

*M.lep TR/Trxh*  
*Arab TR-link-Trxh*

60 70 80 90 100  
 GGAEMTTTBEVNYPCERNNGIICPELMDDMREQALRFGAEELRYEDVESVSL  
 GGQLITTTTDVNEFPGEPEGILGVVELTDKPRKQSERRFGTTITPTETITKVD

*M.lep TR/Trxh*  
*Arab TR-link-Trxh*

110 120 130 140 150  
 RGPIKSVVYTABGQTYQARAVILAMGTSVRYLQIPGEQE:::LLGRGVSA  
 SSKPFPKEFLDS:KAILADAVILATGAVAKRESFVGSQEGSQGFWRNGISA

*M.lep TR/Trxh*  
*Arab TR-link-Trxh*

160 170 180 190 200  
 CATCDGS::PFRQQDLAVFGGCDSEMEELALFLTRFAARSVITLVHRRDEPRA  
 CAVCGDGAAPIFRNKPLAVFGGCDSEMEELANFLTKYGSKVYIIRRDAPRA

*M.lep TR/Trxh*  
*Arab TR-link-Trxh*

210 220 230 240 250  
 SKIMLGRARNNDKEKFITINHIVVAVNG:::YITIVTGLRLRNITITGEETITL  
 SKIMQQRALSNPKIDVFWNSSVVEAYGDGERDVLGGIKVKKNVVTGDDVSDL

*M.lep TR/Trxh*  
*Arab TR-link-Trxh*

260 270 280 290 300  
 VVTGVFVVAIGREPRLSLSLVSDVVDLDPDGIVVLVKGRITTSFSMDGVPAAGDL  
 KVSGLFFVAIGREPRLATKFLDGGVVELDSDGIVVTKPGITTSVPGVPAAGDV

*M.lep TR/Trxh*  
*Arab TR-link-Trxh*

310 320 330 340 350  
 VDRITYROAFTAAAGSGCAAAIDDAERWLAHEHAGSKANETTEETGDDVDSTDTT  
 QDKKYROAFTAAAGTGCMAAALDAEHYLOEIAAGSKANETTEETGDDVDSTDTT

*M.lep TR/Trxh*  
*Arab TR-link-Trxh*

360 370 380 390 400  
 DWSTAMITD:::AKNAQVITIEVTDASFFADVLESNNKP:::VLVDDEWATW  
 DWSTAMIEEGQVIACEEBCQVIACHTVEBTWNBEQEQKANESKTLVVVDERTASW

*M.lep TR/Trxh*  
*Arab TR-link-Trxh*

410 420 430 440 450  
 CGPCKMVAFFVLEELAASEQRNQITVAKLVDVDTNPREMARBEFQVYSIPTMTL  
 CGPCKRFIAFFPADLAKKLPN:VLFLLKVDTDDELKSSVA SDWA EQAMPPTMFL

*M.lep TR/Trxh*  
*Arab TR-link-Trxh*

460 470 480 490 500  
 QGGQPVKRIVCAKQKAALRLRDLSDVVPNLN  
 KEGKILDKVVGAK:KDEEQSTIAKHLA

FIGURE 3



### DTNB Assay Summary

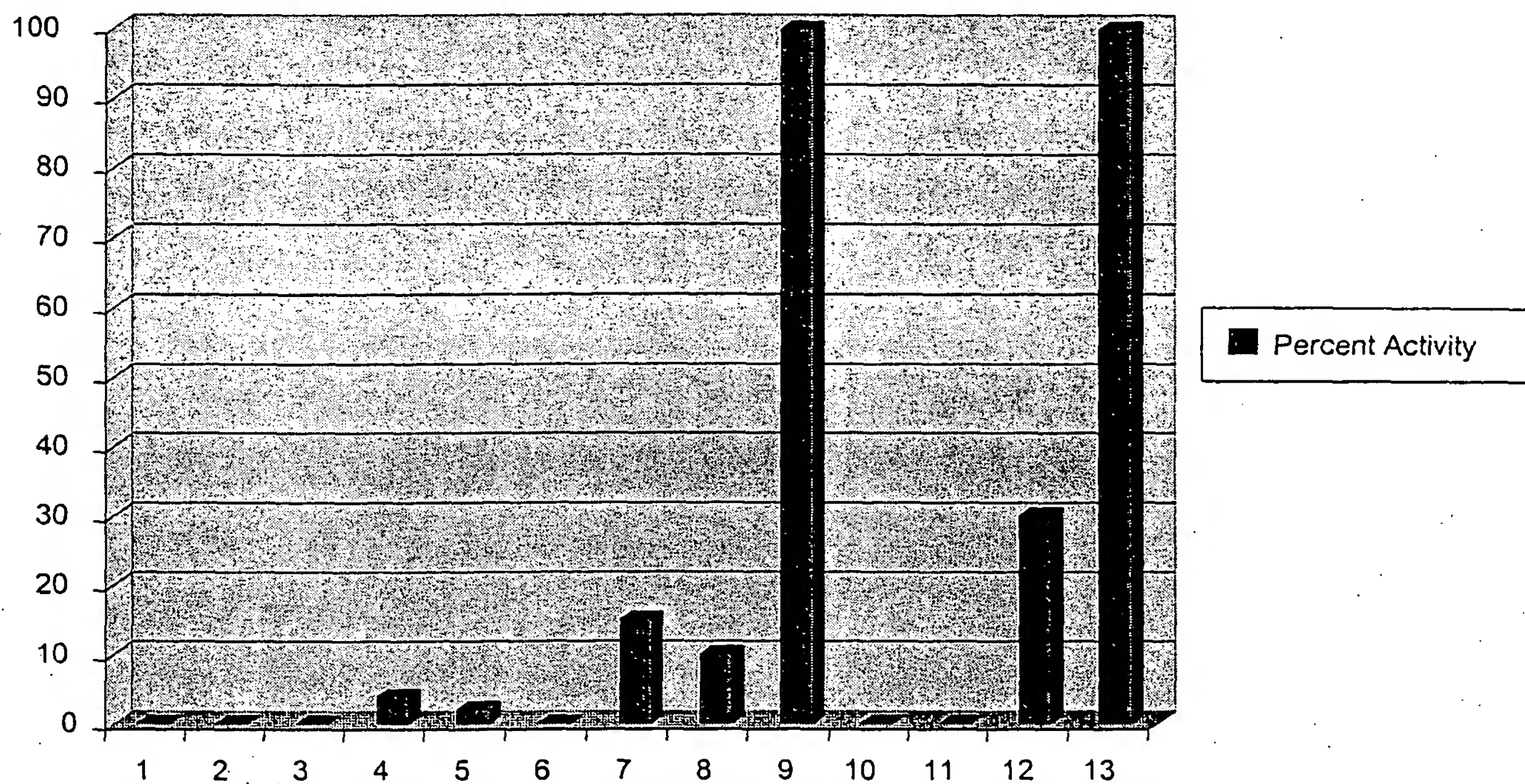


FIGURE 4

# HETEROMULTIMERS

Class	Heteromultimer	Example sequence reference for heteromultimeric subunits
Biosynthetic	3-methyl-2-oxobutanoate dehydrogenase (2-oxoisovalerate dehydrogenase (lipoamide))- E1 component)	McKean, <i>et al.</i> Biochim. Biophys. Acta (1992) 1171:109-112 / Chuang, J.L., <i>et al.</i> FEBS Lett. a (1990) 262 (2), 305-309.
Biosynthetic	3-oxoadipate CoA-transferase	Parales, R.E. and Harwood, S.C. J. Bacteriol. (1992) 174:4657-4666
Biosynthetic	anthranilate synthase:indole-3-glycerol phosphate synthase	Zalkin, H.; <i>et al.</i> J. Biol. Chem. (1984) 259:3985-3992 .
Biosynthetic	beta-ketoacyl-[acyl carrier protein] synthase I	Siggaard-Andersen, M. <i>et al.</i> Proc. Natl. Acad. Sci. U.S.A. (1991) 88:4114-4118
Biosynthetic	butyrate--acetoacetate CoA-transferase	Fischer, R.J., <i>et al.</i> J. Bacteriol. (1993) 175 (21), 6959-6969.
Biosynthetic	cAMP dependent protein kinase	Mutzel, R <i>et al.</i> Proc. Natl. Acad. Sci. U.S.A. (1987) 84:6-10./ Burki, E., <i>et al.</i> Gene (1991) 102 (1), 57-65.
Biosynthetic	carbamoyl-phosphate synthase	Shigenobu, S., <i>et al.</i> Nature. (2000) 407 (6800), 81-86.
Biosynthetic	Creatine kinase	Billadello, J.J.; <i>et al.</i> Biochem. Biophys. Res. Commun. (1986) 138:392-398. / Roman, D.; <i>et al.</i> Proc. Natl. Acad. Sci. U.S.A. (1985) 82:8394-8398.
Biosynthetic	gamma-glutamyltransferase (gamma-glutamyl transpeptidase)	Papandrikopoulou, A.; <i>et al.</i> Eur. J. Biochem. (1989) 183:693-698.
Biosynthetic	glutathione transferase	Morrow, C.S. <i>et al.</i> Gene (1989) 75:3-11
Biosynthetic	glycerol-3-phosphate dehydrogenase	Cole, S.T. <i>et al.</i> J. Bacteriol. (1988) 170:2448-2456.
Biosynthetic	guanylate cyclase	Hinsch, K.D. <i>et al.</i> FEBS Lett. (1988) 239:29-34/ Koesling, D. <i>et al.</i> FEBS Lett. (1990) 266:128-132.
Biosynthetic	heterodisulfide reductase	Smith, D.R., <i>et al.</i> J. Bacteriol. (1997) 179 (22), 7135-7155.
Biosynthetic	human cathepsin	Ritonja, A. <i>et al.</i> FEBS Lett. (1988) 228:341-345.
Biosynthetic	Hydrogenase	Menon, N.K. <i>et al.</i> J. Bacteriol. (1990) 172:1969-1977.
Biosynthetic	Meprin A	Johnson, G.D. and Hersh, L.B. J. Biol. Chem. (1992) 267:13505-13512.
Biosynthetic	methionine adenosyltransferase	Horikawa, S.; Tsukada, K. FEBS Lett. (1992) 312:37-41.
Biosynthetic	methylmalonyl-CoA mutase	Jackson, C.A. <i>et al.</i> Gene (1995) 167:127-132.
Biosynthetic	mitochondrial processing peptidase	Pollock, R.A. <i>et al.</i> EMBO J. (1988) 7:3493-3500.
Biosynthetic	Na <sup>+</sup> /K <sup>+</sup> -exchanging ATPase	Shull, G.E., <i>et al.</i> Biochemistry (1986) 25 (25), 8125-8132./ Mercer, R.W., <i>et al.</i> Mol. Cell. Biol. (1986) 6 (11), 3884-3890./ Mercer, R.W., <i>et al.</i> J. Cell Biol. (1993) 121 (3), 579-586.
Biosynthetic	NAD(+)-dependent isocitrate dehydrogenase	Cupp, J.R. and McAlister-Henn, L. J. Biol. Chem. (1992) 267:16417-16423. /Cupp, J.R. and McAlister-Henn, L. J. Biol. Chem. (1991) 266:22199-22205.
Biosynthetic	phosphoribosylformylglycinamide synthase	Ebbole, D.J.; Zalkin, H. J. Biol. Chem. (1987) 262:8274-8287.
Biosynthetic	protocatechuate 3,4-dioxygenase	Frazer, R.W.; <i>et al.</i> J. Bacteriol. (1993) 175:6194-6202.
Biosynthetic	S-100 protein	Engelkamp, D.; <i>et al.</i> Biochemistry (1992)

FIGURE 5

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		31:10258-10264. / Allore, R.J.; <i>et al.</i> J. Biol. Chem. (1990) 265:15537-15543.
Biosynthetic	sucrose--fructan 6-fructosyltransferase	Sprenger, N.; <i>et al.</i> Proc. Natl. Acad. Sci. U.S.A. (1995) 92:11652-11656.
Biosynthetic	Superoxide dismutase	Capo, C.R.; <i>et al.</i> Biochem. Biophys. Res. Commun. (1990) 173:1186-1193.
Biosynthetic	Urease	Labigne, A.; <i>et al.</i> J. Bacteriol. (1991) 173:1920-1931.
Biosynthetic	urokinase-type plasminogen activator (urokinase)	Belin, D. <i>et al.</i> Eur. J. Biochem. (1985) 148:225-232.
Biosynthetic	methylmalonyl-coenzyme A mutase	Birch, A.; <i>et al.</i> J. Bacteriol. (1993) 175 (11), 3511-3519.
Calcium binding	Calcineurin	Muramatsu, T. and Kincaid, R.L. Biochim. Biophys. Acta (1993) 1178 (1), 117-120 / Guerini, D. <i>et al.</i> DNA (1989) 8:675-682.
Calcium binding	Calgranulin	Imamichi, T. <i>et al.</i> Biochem. Biophys. Res. Commun. (1993) 194:819-825.
Calcium binding	Calpain	Aoki, K. <i>et al.</i> FEBS Lett. (1986) 205:313-317.
DNA binding	AP1	van Straaten, F.; <i>et al.</i> Proceedings of the National Academy of Sciences of the United States of America. (1983) 80 (11), 3183-3187. / Hattori, K.; <i>et al.</i> Proceedings of the National Academy of Sciences of the United States of America. (1988) 85 (23), 9148-9152.
DNA binding	cMyc-Max	Schreiber-Agus, N. <i>et al.</i> Mol. Cell. Biol. (1993) 13 (5), 2765-2775.
DNA binding	DNA binding protein HU-1/HU-2	Laine, B. <i>et al.</i> Eur. J. Biochem. (1980) 103:447-461.
DNA binding	hepatic nuclear factor 1	Bach, I. <i>et al.</i> Nucleic Acids Res. (1992) 20 (16), 4199-4204. / Rey-Campos, J. <i>et al.</i> EMBO J. (1991) 10 (6), 1445-1457.
DNA binding	Integration host factor	Miller, H.I. Cold Spring Harbor symposia on quantitative biology. (1984) 49, 691-698. / Flamm, E. and Weisberg, R.A. J. Mol. Biol. (1985) 183:117-128.
DNA binding	Ku	Reeves, W.H. and Stoege, Z.M. J. Biol. Chem. (1989) 264 (9), 5047-5052. / J. Biol. Chem. (1989) 264 (23), 13407-13411.
DNA binding	MutS	Bocker <i>et al.</i> 1999. Cancer Research 59, 816-822.
DNA binding	NF-E2	Chan, J.Y. <i>et al.</i> Proc. Natl. Acad. Sci. U.S.A. (1993) 90 (23), 11366-11370. / Toki, T.; <i>et al.</i> Oncogene (1997) 14 (16), 1901-1910.
DNA binding	nuclear factor kB (NFkB)	Kieran M, <i>et al.</i> Cell. (1990) Sep 7;62(5):1007-18. / Ruben SM, <i>et al.</i> Science (1991) Mar 22;251(5000):1490-3. Erratum in: Science (1991) Oct 4;254(5028):11
Electron transport	corrinoid/iron-sulfur protein	Lu, W.P. <i>et al.</i> J. Biol. Chem. (1993) 268:5605-5614.
Electron transport	cytochrome d ubiquinol oxidase	Green, G.N. <i>et al.</i> J. Biol. Chem. (1988) 263:13138-13143.
Electron transport	cytochrome-c3 hydrogenase	Menon, N.K. <i>et al.</i> J. Bacteriol. (1987) 169:5401-5407.
Electron transport	electron transfer flavoprotein	Finocchiaro, G. <i>et al.</i> Biol. Chem. (1988) 263:15773-15780. / Finocchiaro, G. <i>et al.</i> Eur. J. Biochem. (1993) 213:1003-1008.



Electron transport	xylene monooxygenase	Shaw, J.P. and Harayama, S. Eur. J. Biochem. (1992) 209:51-61. / Kasai, Y., <i>et al.</i> J. Bacteriol. (2001) 183 (22), 6662-6666.
Growth factor	hepatocyte growth factor	Nakamura, T. <i>et al.</i> Nature (1989) 342:440-443.
Growth factor	human chorionic gonadotropin	Morgan, F.J. <i>et al.</i> J. Biol. Chem. (1975) 250 (13), 5247-5258.
Growth factor	Platelet-derived growth factor	Takimoto, Y., <i>et al.</i> Hiroshima J. Med. Sci. (1993) 42 (1), 47-52. / Josephs, S.F., <i>et al.</i> Science (1984) 225 (4662), 636-639.
Hormone	Bombyxin	Adachi, T. <i>et al.</i> J. Biol. Chem. (1989) 264:7681-7685.
Hormone	Follicle stimulating hormone	Fiddes, J.C. and Goodman, H.M. J. Mol. Appl. Genet. (1981) 1 (1), 3-18. / Watkins, P.C., <i>et al.</i> DNA (1987) 6 (3), 205-212.
Hormone	Insulin	Bell, G.I., Pictet, R.L., Rutter, W.J., Cordell, B., Tischer, E. and Goodman, H.M. Sequence of the human insulin gene. Nature. 284 (5751), 26-32 (1980)
Hormone	Luteinizing Hormone	Fiddes, J.C. and Goodman, H.M. J. Mol. Appl. Genet. (1981) 1 (1), 3-18. / Shome, B. and Parlow, A.F. J. Clin. Endocrinol. Metab. (1973) 36 (3), 618-621.
Hormone	Thyroid stimulating hormone	Fiddes, J.C. and Goodman, H.M. J. Mol. Appl. Genet. (1981) 1 (1), 3-18. / Hayashizaki Y, <i>et al.</i> FEBS Lett. (1985) 188 (2), 394-400.
Immune	B-cell antigen receptor complex	Hashimoto, S. <i>et al.</i> J. Immunol. (1993) 150 (2), 491-498. / Flaswinkel, H. and Reth, M. Immunogenetics (1992) 36 (4), 266-269.
Immune	Cell surface CD8 molecules	Ureta-Vidal, A., <i>et al.</i> Immunogenetics (1999) 49 (7-8), 718-721.
Immune	human complement subcomponent C1q	Sellar, G.C. <i>et al.</i> Biochem. J. (1991) 274:481-490.
Immune	T cell receptor	Talken, B.L. <i>et al.</i> Scand. J. Immunol. (2001) 54 (1-2), 204-210.
Photosynthesis	C-phycocyanin	Offner, G.D. <i>et al.</i> J. Biol. Chem. (1981) 256:12167-12175. / Troxler, R.F. <i>et al.</i> J. Biol. Chem. (1981) 256:12176-12184.
Photosynthesis	ferredoxin-thioredoxin reductase	Chow, L.P. <i>et al.</i> Eur. J. Biochem. (1995) 231:149-156. / Iwadate, H. <i>et al.</i> Eur. J. Biochem. (1994) 223:465-471.
Photosynthesis	Light harvesting complex I	Proc. Natl. Acad. Sci. U.S.A. (1984) 81, 189-192.
Photosynthetic	cytochrome b559	Carrillo, N. <i>et al.</i> Curr Genet. 1986;10(8):619-24.
Protease	ATP-dependent Clp protease	Gerth, U. <i>et al.</i> Gene (1996) 181:77-83. / Kunst, F. <i>et al.</i> Nature (1997) 390 (6657), 249-256.
Receptor	alpha-2-macroglobulin receptor	Strickland, D.K. <i>et al.</i> J. Biol. Chem. (1990) 265:17401-17404. / Strickland, D.K. <i>et al.</i> J. Biol. Chem. (1991) 266:13364-13369.
Receptor	Interleukin-2 receptor	Ishida, N. <i>et al.</i> Nucleic Acids Res. (1985) 13:7579-7589. / Hatakeyama, M. <i>et al.</i> Science (1989) 244:551-556 / Takeshita, T. <i>et al.</i> Science (1992) 257:379-382.
Receptor	platelet-derived growth factor receptor	Lee, K.H. <i>et al.</i> Mol. Cell. Biol. (1990) 10:2237-2246. / Herren, B. <i>et al.</i> Biochim. Biophys. Acta 1173 (3), 294-302 (1993).
Structural	Hemoglobin	Heindell, H.C. <i>et al.</i> Cell (1978) 15 (1), 43-54. /

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		Best, J.S. <i>et al.</i> Hoppe-Seyler's Z. Physiol. Chem. (1989) 350 (5), 563-580. / Hardison, R.C. J. Biol. Chem. (1981) 256 (22), 11780-11786.
Structural	human platelet glycoprotein Ib	Wenger, R.H. <i>et al.</i> Biochem. Biophys. Res. Commun. (1988) 156 (1), 389-395. / Yagi, M. <i>et al.</i> J. Biol. Chem. (1994) 269 (26), 17424-17427.
Structural	Plasma fibronectin	Kornblihtt, A.R. <i>et al.</i> Proc. Natl. Acad. Sci. U.S.A. (1983) 80:3218-3222.
Structural	Spectrin	Sahr, K.E. <i>et al.</i> J. Biol. Chem. (1990) 265:4434-4443. / Winkelmann, J.C. <i>et al.</i> J. Biol. Chem. (1990) 265:11827-11832.
Structural	Tubulin	Ponstingl, H. <i>et al.</i> Proc. Natl. Acad. Sci. U.S.A. (1981) 78:2757-2761. / Krauhs, E. <i>et al.</i> Proc. Natl. Acad. Sci. U.S.A. (1981) 78:4156-4160.
Toxin	Agkisacutacin	Cheng, X. <i>et al.</i> Biochem. Biophys. Res. Commun. (1999) 265 (2), 530-535.
Toxin	Beta bungarotoxins	Kondo, K. <i>et al.</i> J. Biochem. (1978) 83:101-115.
Toxin	Crotoxin	Bouchier, C. <i>et al.</i> Nucleic Acids Res. (1988) 16 (18), 9050.
Toxin	Mojave toxin	John, T.R. <i>et al.</i> Gene (1994) 139:229-234.
Toxin	venom protein C9S3	Rowan, E.G. <i>et al.</i> Nucleic Acids Res. (1990) 18:1639. / Joubert, F.J. and Viljoen, C.C. Hoppe-Seyler's Z. Physiol. Chem. (1979) 360:1075-1090.
Miscellaneous	Inhibin	Forage, R.G. <i>et al.</i> Proc. Natl. Acad. Sci. U.S.A. (1986) 83:3091-3095.
Miscellaneous	Monellin	Frank, G. and Zuber, H. Hoppe-Seyler's Z. Physiol. Chem. (1976) 357:585-592.
Miscellaneous	mRNA capping enzyme	Niles, E.G. <i>et al.</i> , J. Virology (1986) 153:96-112.
Miscellaneous	Soybean insulin-binding protein si30	Barbashov, S.F. <i>et al.</i> Bioorg. Khim. (1991) 17:421-423.